



IRIG STANDARD 703-02

FREQUENCY MANAGEMENT GROUP

**STANDARD ELECTRONIC ATTACK
CLEARANCE REQUEST FOR RANGES**

NOVEMBER 2002

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IRIG STANDARD 703-02

**STANDARD ELECTRONIC ATTACK
CLEARANCE REQUEST FOR RANGES**

NOVEMBER 2002

Prepared by

**FREQUENCY MANAGEMENT GROUP
RANGE COMMANDERS COUNCIL**

Published by

**Secretariat
Range Commanders Council
U.S. Army White Sands Missile Ranges,
New Mexico, 88002-5110**

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PREFACE

This IRIG Standard replaces document 703-94 and provides updated information on the procedures for obtaining Electronic Attack (EA) clearances for the test and training ranges in the United States and its Possessions.

Appendix A, which lists EA frequencies and coordination requirements, has been significantly updated to reflect the most current authorization requirements per specified frequency.

Appendix B outlines the requirements and rationale for the Frequency Clearance Request Memorandum. Helpful examples have been added to illustrate specific points in the requirements.

A new Appendix C addresses EA activity in relation to GPS radio navigation in the L1 and L2 frequency bands.

The FMG welcomes any comments, questions, corrections, additions, or deletions to this document. Any inquiries should be addressed to:

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ACRONYMS AND INITIALISMS

AFC	Area Frequency Coordinator
agl	above ground level
AOR	area of responsibility
ATC	Air Traffic Control
ARTCC	Air Route Traffic Control Center
CJCSM	Chairman Joint Chief of Staff Manual
CONUS	Continental United States
CY	calendar year
DDGO	Deputy Director for Global Operations
DMS	Defense Message System
DOD	Department of Defense
DOE	Department of Energy
DOT	Department of Transportation
EA	Electronic Attack
ECM	Electronic Countermeasures
EP	Electronic Protection
EPA	Environmental Protection Agency
ES	Electronic Warfare Support
FAA	Federal Aviation Administration
FCC	Federal Communication Commission
FMO	Frequency Management Office
GPS	Global Positioning System
GPSSC	GPS Support Center
IRIG	Inter-range Instrumentation Group
ITAS	Integrated Topographic Analysis System
JSC	Joint Spectrum Center
MOA	military operations area
msl	mean sea level
NEPA	National Environmental Policy Act of 1969
nm	nautical miles
SIPRNET	Secret Internal Protocol Router Network
US&P	United States and Possessions

CHAPTER 1

STANDARD ELECTRONIC ATTACK CLEARANCE REQUEST FOR RANGES

1.0 Introduction

Electronic Attack (EA), formerly known as Electronic Countermeasures (ECM), includes both electronic jamming and chaff dispensing operations. EA is a subdivision of Electronic Warfare, which also consists of Electronic Protection (EP) and Electronic Warfare Support (ES). EA in the United States is an important element of DOD weapons systems testing and military training. The purpose of this document is to furnish guidance on the procedures for obtaining EA clearance for operations on U.S. ranges and within adjoining areas of restricted military air space.

EA operations often require the sharing of bands used or controlled by other agencies. Because of the disruptive nature of EA and the serious consequences of uncontrolled EA on safety-of-life systems such as air and sea navigation and air-traffic control, special coordination requirements have been instituted for obtaining EA authorization. Agencies of major concern are the Federal Communication Commission (FCC), which has jurisdiction over commercial and private spectrum operations, and the Federal Aviation Administration (FAA), which regulates flight safety. EA may be performed only under the condition that it **not cause harmful interference to other authorized users of the spectrum, especially to safety-of-life systems such as air-traffic control and air/sea radio-navigation systems.**

Specific procedures for coordinating and obtaining authorization for Electronic Attack have been developed in formal agreements between Department of Defense (DOD) and other federal agencies and are documented and disseminated via the Chairman of the Joint Chiefs of Staff Manual CJCSM 3212.02A, dated 11 Mar 02, titled *Performing Electronic Attack in the U.S. and Canada for Tests, Training and Exercises*. A memo outline and instructions for requesting electronic attack clearance, on and around U.S. ranges, are included in Appendix B.

Strict adherence to the agreed parameters delineated in CJCSM 3212.02A is necessary to avoid incidences of electromagnetic interference. In all EA operations, adequate points of contact, telephone numbers and call signs are required. In addition, effective "cease-buzzer" communications are required to quickly and effectively stop EA operations, if harmful interference is reported.

2.0 Application

This IRIG Standard and the joint directive for EA, CJCSM 3212.02A, apply to all DOD components and civilian contractor EA operations. It includes geographic areas of the United States, United States Possessions, Canada, and areas within 200 nm seaward of the U.S., U.S. Possessions and Canadian coastal provinces and territories.

3.0 Operational Definitions

3.1 EA Mission: Surface and/or in-flight EA done with one or more electronic jammers and/or chaff dispensing aircraft.

3.2 Local EA Clearance: Frequency clearance for electronic jamming, which does not require national level approval, but which does require coordination with the DOD Area Frequency Coordinator (AFC), range or other installation frequency manager who will issue frequency authorization and perform necessary local coordination. Requests should be submitted at least 30 days prior to requested start date.

3.3 National EA Clearance: EA frequency and chaff clearance requiring national level coordination with FAA, FCC and other Government agencies. Request is submitted through the local DOD AFC, range or installation frequency manager to one of the service national level frequency management offices. Requests should be submitted at least 90 days prior to requested start date.

3.4 Special EA Operations: Testing and/or special training events, conducted on other than a recurring basis and not covered by an existing clearance, require special detailed coordination and approval for operating areas, times, frequencies, chaff types, altitudes, and other EA operational procedures. Requests should be submitted at least 90 days prior to requested start date.

3.5 EA Frequency Bands: The spectrum is divided into specified bands from 0 Hz to 300 GHz, with each band assigned a category of coordination required for electronic jamming. These categories are *local*, *local FCC* (requiring local coordination), and *national level* (requiring formal agreement at the national departmental level). **All planned Electronic Attack missions must be coordinated, prior to start, with the local DOD AFC, range Frequency Management Office (FMO), or other installation frequency manager.** The required lead-time can vary from days (local, local FCC) to months (national). A current list of EA frequencies, along with required coordination/approval levels, is presented in Appendix A.

4.0 EA Chaff Operations

There are three kinds of chaff. "Training chaff," like RR-144 and RR-188 cut for H, I and J bands (6000 to 20 000 MHz), is now used for all tactical training missions in the Continental U.S. (CONUS). Training chaff activities must be scheduled with the controlling agency (DOD range or FAA center), coordinated with the DOD AFC (if within their area of responsibility {AOR}), and conducted within the limits of the national clearance approval document. The chance of interference to FAA systems by this chaff is minimal. However, the FAA authorization requires notification of the local controlling FAA Air Route Traffic Control Center (ARTCC) prior to dispensing training chaff.

The other two types of chaff being dispensed in the U.S. are "tactical chaff" and other similar chaff cuts designated "research and developmental chaff," and these are used for testing of weapons systems. These are typically cut for frequencies below H-band, including S-band,

which can and has caused harmful interference to FAA S-band terminal radar systems. This chaff requires national level approval including FAA. Most ranges have yearly blanket approvals for research and development (R&D) and tactical chaff operations. There are more restrictions and additional costs associated with dropping this chaff. Measurement of winds aloft and radar tracking of chaff bursts and clouds may be required.

Authorization for R&D or tactical chaff dispensing must be requested through the DOD AFC or range frequency manager, and approved missions must be scheduled with the range control activity who will ensure compliance with specified meteorological and radar support requirements. **R&D and tactical chaff cannot be dispensed if prevailing winds will carry the chaff into FAA air traffic control areas or into designated high and low altitude air routes.**

5.0 GPS EA Coordination

Global Positioning System (GPS) EA is a unique operation requiring special authorization from the Joint Staff and FAA. It also requires inter-range and inter-DOD AFC coordination. Three conditions must be met for the request submission to be considered for approval by national level authorities:

- a. The request must be submitted at least 60 days prior to requested start date.
- b. The modeling results of an approved GPS engineering tool must be submitted with the EA request. The current approved modeling tool is GPS-ITAS (GPS Integrated Topographic Analysis System).
- c. A report containing the ON and OFF times of the GPS EA jammer for the test, training or exercise must be submitted to the Joint Staff.

Specific information required and formats of the request and report are in Appendix B.

6.0 EA Coordination

Most DOD test and training ranges already have conditional blanket EA clearances in place that include electronic jamming bands and chaff types for local as well as national-level coordinated EA activities. However, clearance to conduct EA activities must always be coordinated through the local controlling DOD AFC or other DOD range or installation frequency manager prior to activation. If an EA band category or chaff type requires national-level approval and has not been included in an existing conditional blanket clearance, the EA request must be submitted at least 90 days prior to the activation date. This allows time for the local DOD AFC or FMO to forward the request and negotiate approval at the national level. Scheduling of EA operations is required on DOD test and training ranges.

7.0 In-flight Requirements

Aircraft and ground controllers must monitor Guard frequencies 121.5 or 243.0 MHz and, normally, an additional designated communication channel for control of range EA operations.

8.0 EA Terminology

A number of standard phrases used by aircraft and controllers during EA operations are listed below:

- 8.1 Buzzer: Unclassified word for electronic noise jamming or deception.
- 8.2 Barrage Jamming: Simultaneous electronic jamming over a broad band of frequencies.
- 8.3 Spot Jamming: Jamming of a specific frequency or narrow frequency channel.
- 8.4 Sweep Jamming: A narrow band of jamming that is swept back and forth over a given frequency band.
- 8.5 Cease Buzzer: An order to terminate EA activities, to include EW expendables. Aircraft and ground controllers must acknowledge all such requests.
- 8.6 Big Photo: Unclassified general call sign used to contact aircraft performing in-flight EA.
- 8.7 Ground Photo: Unclassified general call sign for surface sites actively performing EA.
- 8.8 Chaff: Radar confusion reflectors consisting of thin, narrow metallic strips or metal coated glass fiber strips of various lengths and frequency responses, which are used to confuse reflected radar signals.¹

¹ Joint Chiefs of Staff, *Dept. of Defense Dictionary of Military and Associated Terms*, Publication 1-02, April 2001.

APPENDIX A

TABLE OF ELECTRONIC ATTACK FREQUENCIES, BAND DESIGNATORS AND COORDINATION REQUIREMENTS

This Appendix contains a current list of electronic attack (EA) frequency bands as well as their coordination and approval requirements. Information in this Appendix is excerpted from publication CJCSM 3212.02.²

1.0 Operational Band and Channel Codes

The following bands and channels listed in Table A-1 are set up to give one standard system of frequency band designations for EW operations and to facilitate the operational control of EW. The bands are identified in alphabetical sequence. Each band is divided into 10 numerical channels. The phonetic alphabet and numerical channel numbers are used to identify the EW frequency. During operations, when it becomes necessary to identify an exact frequency, the frequency is specified as a numerical designation (lowest frequency in any channel) plus frequency in MHz above the base frequency. Example for 1315 MHz: DELTA 4 covers the frequency range 1300-1400 MHz; therefore, 1315 MHz would be designated DELTA 4 plus 15.

TABLE A-1. FREQUENCY BAND DESIGNATIONS		
Band	Frequency (MHz)	Channel Width (MHz)
A(lpha)	0 - 250	25
B(ravo)	250 - 500	25
C(harlie)	500 - 1000	50
D(elta)	1000 - 2000	100
E(cho)	2000 - 3000	100
F(oxtro)	3000 - 4000	100
G(olf)	4000 - 6000	200
H(otel)	6000 - 8000	200
I(ndia)	8000 - 10 000	200
J(uliet)	10 000 - 20 000	1000
K(ilo)	20 000 - 40 000	2000
L(ima)	40 000 - 60 000	2000
M(ike)	60 000 - 100 000	4000
N(ovember)	100 000 - 200 000	10 000
O(scar)	200 000 - 300 000	10 000

² Chairman Joint Chiefs of Staff Manual, *Performing Electronic Attack in the United States and Canada for Test, Training and Exercises*, March 2002

2.0 Frequency Band Correlation

Table A-2 depicts the correlation between previous frequency band designations (sometimes used by ARTCC) and band designators defined in this enclosure.

TABLE A-2. FREQUENCY BAND CORRELATION		
Frequency Range	EW Frequency Band* Radar Design	Frequency Band
0-250 MHz	A	HF/VHF
250-500 MHz	B	UHF
500-1000 MHz	C	UHF
1-2 GHz	D	L
2-3 GHz	E	S
3-4 GHz	F	S
4-6 GHz	G	C
6-8 GHz	H	C
8-10 GHz	I	X (8-12.5 GHz)
10-20 GHz	J	Ku (12.5-18 GHz)
20-40 GHz	K	K (18-26.5 GHz)
40-60 GHz	L	Ka (26.5-40 GHz)
60-100 GHz	M	40-100 millimeter
100-200 GHz	N	Sub-millimeter
200-300 GHz	O	Sub-millimeter
* Band designations sometimes used by ARTCC.		

3.0 EA Coordination Requirements by Frequency Band

a. Local FCC. These frequencies are governed by FCC licensing procedures, but are available through coordination with FCC field engineers. In a few cases, this coordination procedure is also used with the FAA for some bands under their regional control. Coordination is required through the DOD AFC, range, or other local frequency management.

b. National Coordination. These frequencies require National department level coordination. Typically, coordination will take 60 to 90 days (if authorization has not been previously obtained for range use on a yearly basis). An in-depth analysis is often required unless similar systems have been previously coordinated and tested. The local DOD AFC, range, or other local frequency management offices, will acquire necessary operational

information and will initiate the national level coordination. A minimum of 90 days lead-time is required.

4.0 **Frequency Band Status**

4.1 The following list of frequencies in Table A-3 has been coordinated at the national level. The status of the frequency bands for EW in the United States are annotated below as *Local*, *Local FCC* or *National*.

4.2 **No EA can be activated in and around any test range without coordination with the cognizant DOD AFC, range or other Frequency Management Office.**

TABLE A-3. LEVEL OF COORDINATION REQUIRED BY FREQUENCY BAND		
Band & Channel	Frequency (MHz)	United States Coordination Requirement
A-1	0-25	National
A-2	25-50	National
A-3	50-75.2 [50-54 54-73 73-75.2]	Local Local (FCC) National ¹
A-4	75.2-100 [75.2-75.4 75.4-100]	National Local (FCC)
A-5	100-125 [100-108 108-125]	Local (FCC) National ¹
A-6	125-150 [125-138 138-150]	National ¹ Local
A-7	150-175 [150-156 156-158 158-161 161-174 174-175]	Local National Local National Local (FCC)

TABLE A-3. LEVEL OF COORDINATION REQUIRED BY FREQUENCY BAND		
Band & Channel	Frequency (MHz)	United States Coordination Requirement
A-8	175-200	Local (FCC)
A-9	200-225 [200-216 216-222 222-225]	Local (FCC) National Local
A-10	225-250 [225-242.5 242.5-243.5 243.5-250]	National ¹ National (Guard Frequency) ¹ National ¹
B-1	250-275	National ¹
B-2	275-300	National ¹
B-3	300-325	National ¹
B-4	325-350	National ¹
B-5	350-375	National ¹
B-6	375-400	National ¹
B-7	400-425 [400-420 420-425]	National Local
B-8	425-450 [425-448 448-450]	Local National
B-9	450-475	National
B-10	475-500	National
C-1	500-550 [500-512 512-550]	National ¹ Local (FCC)

**TABLE A-3. LEVEL OF COORDINATION REQUIRED BY
FREQUENCY BAND**

Band & Channel	Frequency (MHz)	United States Coordination Requirement
C-2	550-600	Local (FCC)
C-3	600-650 [600-608 608-614 614-650]	Local (FCC) National Local (FCC)
C-4	650-700	Local (FCC)
C-5	700-750	Local (FCC)
C-6	750-800	Local (FCC)
C-7	800-850 [800-806 806-850]	Local (FCC) National
C-8	850-900	National
C-9	900-950 [900-902 902-928 928-950]	National Local National ¹
C-10	950-1,000 [950-960 960-1000]	National National ¹
D-1	1000-1100	National ¹
D-2	1100-1200	National ¹
D-3	1200-1300	National ¹
D-4	1300-1400 [1300-1390 1390-1400]	National ¹ National
D-5	1400-1500	National ¹

**TABLE A-3. LEVEL OF COORDINATION REQUIRED BY
FREQUENCY BAND**

Band & Channel	Frequency (MHz)	United States Coordination Requirement
D-6	1500-1600	National ¹
D-7	1600-1700	National ¹
D-8	1700-1800	National
D-9	1800-1900	National
D-10	1900-2000	National
E-1	2000-2100	National
E-2	2100-2200	National
E-3	2200-2300	National
E-4	2300-2400 [2300-2305 2305-2390 2390-2400]	Local National Local
E-5	2400-2500 [2400-2483.5 2483.5-2500]	Local National
E-6	2500-2600	National
E-7	2600-2700	National
E-8	2700-2800	National ¹
E-9	2800-2900	National ¹
E-10	2900-3000	National
F-1	3000-3100	National
F-2	3100-3200	Local

**TABLE A-3. LEVEL OF COORDINATION REQUIRED BY
FREQUENCY BAND**

Band & Channel	Frequency (MHz)	United States Coordination Requirement
F-3	3200-3300	Local
F-4	3300-3400	Local
F-5	3400-3500	Local
F-6	3500-3600	Local
F-7	3600-3700 [3600-3650 3650-3700]	Local National
F-8	3700-3800	National
F-9	3800-3900	National
F-10	3900-4000	National
G-1	4000-4200	National
G-2	4200-4400	National ¹
G-3	4400-4600	Local
G-4	4600-4800 [4600-4635 4635-4685 4685-4800]	Local National Local
G-5	4800-5000 [4800-4,90 4990-5000]	Local National
G-6	5000-5200	National ¹
G-7	5200-5400 [5200-5250 5250-5400]	National ¹ Local

**TABLE A-3. LEVEL OF COORDINATION REQUIRED BY
FREQUENCY BAND**

Band & Channel	Frequency (MHz)	United States Coordination Requirement
G-8	5400-5600	Local
G-9	5600-5800 [5600-5650 5650-5800]	National ¹ Local
G-10	5800-6000 [5800-5850 5850-6000]	Local National
H-1	6000-6200	National
H-2	6200-6400	National
H-3	6400-6600	National
H-4	6600-6800	National
H-5	6800-7000	National
H-6	7000-7200	National
H-7	7200-7400	National
H-8	7400-7600	National
H-9	7600-7800	National
H-10	7800-8000	National
I-1	8000-8200	National
I-2	8200-8400	National
I-3	8400-8600 [8400-8500 8500-8600]	National Local
I-4	8600-8800	Local

**TABLE A-3. LEVEL OF COORDINATION REQUIRED BY
FREQUENCY BAND**

Band & Channel	Frequency (MHz)	United States Coordination Requirement
I-5	8800-9000	Local
I-6	9000-9200	National ¹
I-7	9200-9400 [9200-9300 9300-9400]	Local National
I-8	9400-9600 [9400-9500 9500-9600]	National Local
I-9	9600-9800	Local
I-10	9800-10 000	Local
J-1	10 000-11 000 [10 000-10 550 10 550-11 000]	Local National
J-2	11 000-12 000 [11 000-11 700 11 700-12 000]	National Local (FCC)
J-3	12 000-13 000	Local (FCC)
J-4	13 000-14 000 [13 000-13 250 13 250-14 000]	Local (FCC) Local ²
J-5	14 000-15 000	National
J-6	15 000-16 000	National ¹
J-7	16 000-17 000	National ¹
J-8	17 000-18 000 [17 000-17 700 17 700-18 000]	National ¹ Local (FCC)

**TABLE A-3. LEVEL OF COORDINATION REQUIRED BY
FREQUENCY BAND**

Band & Channel	Frequency (MHz)	United States Coordination Requirement
J-9	18 000-19 000	Local (FCC)
J-10	19 000-20 000 [19 000-19 700 19 700-20 000]	Local (FCC) National
K-1	20 000-22 000	National
K-2	22 000-24 000	National
K-3	24 000-26 000 [24 000-24 050 24 050-26 000]	Local National
K-4	26 000-28 000 [26 000-27 500 27 500-28 000]	Local National
K-5	28 000-30 000	National
K-6	30 000-32 000 [30 000-31 300 31 300-31 800 31 800-32 000]	Local (FCC) National Local
K-7	32 000-34 000	Local
K-8	34 000-36 000	Local
K-9	36 000-38 000	National
K-10	38 000-40 000	National
L-1	40 000-42 000	National
L-2	42 000-44 000 [42 000-42 500 42 500-44 000]	National Local

**TABLE A-3. LEVEL OF COORDINATION REQUIRED BY
FREQUENCY BAND**

Band & Channel	Frequency (MHz)	United States Coordination Requirement
L-3	44 000-46 000 [44 000-44 500 44 500-46 000]	Local National
L-4	46 000-48 000	National
L-5	48 000-50 000	National
L-6	50 000-52 000 [50 000-51 400 51 400-52 000]	Local National
L-7	52 000-54 000	National
L-8	54 000-56 000	National
L-9	56 000-58 000	National
L-10	58 000-60 000	National
M-1	60 000-64 000	Local
M-2	64 000-68 000	Local
M-3	68 000-72 000	Local
M-4	72 000-76 000	Local
M-5	76 000-80 000 [76 000-77 000 77 000-80 000]	National Local
M-6	80 000-84 000	Local
M-7	84 000-88 000 [84 000-86 000 86 000-88 000]	Local National
M-8	88 000-92 000	National

**TABLE A-3. LEVEL OF COORDINATION REQUIRED BY
FREQUENCY BAND**

Band & Channel	Frequency (MHz)	United States Coordination Requirement
M-9	92 000-96 000	Local
M-10	96 000-100 000	Local
N-1	100 000-110 000 [100 000-100 200 100 200-102 000 102 000-105 000 105 000-110 000]	Local National Local National
N-2	110 000-120 000 [110 000-116 000 116 000-120 000]	National Local
N-3	120 000-130 000	Local
N-4	130 000-140 000	Local
N-5	140 000-150 000	Local
N-6	150 000-160 000	Local
N-7	160 000-170 000 [160 000-164 000 164 000-168 000 168 000-170 000]	Local National Local
N-8	170 000-180 000	Local
N-9	180 000-190 000 [180 000-182 000 182 000-185 000 185 000-190 000]	Local National Local
N-10	190 000-200 000	Local
O-1	200 000-210 000	Local

TABLE A-3. LEVEL OF COORDINATION REQUIRED BY FREQUENCY BAND		
Band & Channel	Frequency (MHz)	United States Coordination Requirement
O-2	210 000-220 000 [210 000-217 000 217 000-220 000]	Local National
O-3	220 000-230 000	Local
O-4	230 000-240 000 [230 000-231 000 231 000-240 000]	National Local
O-5	240 000-250 000	Local
O-6	250 000-260 000 [250 000-252 000 252 000-260 000]	National Local
O-7	260 000-270 000	Local
O-8	270 000-280 000	Local
O-9	280 000-290 000	Local
O-10	290 000-300 000	Local

Notes:

¹ FAA coordination required.

² Except that national coordination is required for the 13 750–14 000 MHz frequency band within 200 nm of the NASA site at Las Cruces.

APPENDIX B

ELECTRONIC ATTACK FREQUENCY CLEARANCE REQUEST MEMORANDUM INSTRUCTIONS AND FORMAT

MEMORANDUM

From: [Requesting Activity]

To: [Your DOD AFC or local Frequency Management Office]

Subject: REQUEST FOR EA FREQUENCY CLEARANCE

References: (a) *Performing Electronic Attack in the United States and Canada for Tests, Training and Exercises* (CJCSM 3212.02A, dated 11 Mar 02)

(b) [As required]

Enclosures: (1) [As required]

The following Electronic Attack (EA) clearance requirements are forwarded in accordance with reference (a):

1.0 Requester. [Point of Contact, commercial/DSN telephone numbers]

2.0 Security Classification Instructions. [Classify in accordance with DOD 5200.1R³ and any applicable classification guides. Enter statement indicating what item entries singularly or collectively (note compilation rule in the directive) make the request classified.]

3.0 EA Clearance Request Control Number. [If desired, this control number will consist of unit designation abbreviation, the calendar year number followed by a hyphen, and an Arabic number assigned consecutively.]

Example: "CLCH 98-4" is the fourth clearance request for CY 1998 by China Lake for chaff.

³ *Department of Defense Information Security Program Regulation, January 1997.*

4.0 EA Operating Areas, Routes, Altitudes and Times of Operation.

4.1 Operational Areas. [Specifically define the geographical bounds in which EA operations will occur. Coordinates will be used to indicate location of ground-operated EA equipment and areas of airborne or shipboard operations. The name/nomenclature of known military operations areas (MOAs), restricted areas, warning areas, air routes or range areas, along with flight levels, will be included in proposals.]

Example: (for warning area) "route of flight within W-368/369 entering from SE" and the central geographic coordinates and nautical mile radius of test areas.

Example: (geographic bounds) 3023N 08600W, 3023N 08700W, 2958N 08600W, 2958N 08700W. Operations occur within a 25 nm radius of 302300N, 0862659W (or GPS-verified coordinates, if available).

4.2 Route of Flight. [In some cases, especially for certain test support missions, it will be necessary to provide a complete description of the operational portion of flight routes, including start, stop and turn points using geographic coordinates. This information can be used to determine the direction of radiation when conducting an interference analysis. Specify any flexibility available in flight routes.]

4.3 Altitude. [Specific dispensing altitudes in above mean sea level (msl) units. Provide the complete range of altitudes that would be acceptable for operations and specify the most desired altitude within the acceptable range.]

4.4 Topographical Layout. [Identify specific terrain features (such as over water or in valley), which mask the effects of the proposed EA and reduce unintended harmful interference.]

Example: Area of EA operations is bordered by 5000-7000-ft mountains to the north and west.

4.5 Time for Requested Activity. [Provide the daily time frame in which EA operations will occur. Express times in Greenwich Mean Time (ZULU) and local time. State if operating hours are hard, limited, and why. Identify flexibility in operating times.]

Example: 0000-2400 hrs daily; however, operations are not continuous, and the operating period is normally no longer than 2 hours, from 0600L-0800L (1100Z-1300Z) daily, with variations based on need of the testers.

5.0 Positive Control (notification/monitoring/controlling procedures). [Provide information concerning standard regulations and/or special operating procedures followed, notification procedures, crew monitoring procedures, range monitoring procedures, and how chaff drops are controlled.]

Example: Positive control is provided for all EA activity in accordance with the following:

- a. *Coordination is accomplished in accordance with this regulation, FAA handbooks 7610.4 and 7610.11 and range regulation XXX.*
- b. *Crew members monitor appropriate Guard frequencies at all times. Range controllers monitor communications channels and jammers for compliance with clearance.*
- c. *Before chaff drops are approved on a range, the dispensing of a single bundle of chaff may first be required to determine if wind conditions are favorable or to verify drift predictions. For afloat naval operations, policy prohibits dropping chaff if forecast impact footprint is within 30 nm of any landmass.*

6.0 EA Frequency Requirements. [Provide a listing of required frequencies and specifications of EA jamming equipment to be used.]

6.1 Frequencies Requested. [Specify the actual operating frequencies or bands required (in megahertz).]

6.2 EA Jamming Equipment Specifications. [Submit nominal worst-case equipment parameters, including RF power, modulation bandwidth, sweep or stepping width and rates, antenna gain, antenna horizontal and vertical beam widths and sideband information.]

6.3 Types of Jamming Required. [Identify type (i.e., noise, spot, barrage, deception, repeater, etc.).]

7.0 Clearance Requests for Chaff Operations

7.1 National Environmental Policy Act of 1969 (NEPA). Chaff will not be dropped due to the potential environmental hazards, unless specific authorization is granted from the Service Environmental Division. The Environmental Protection Agency's NEPA requires that training routes, ranges, and civilian airspaces in CONUS be assessed and approved before chaff may be released. When environmental assessments have been accomplished, frequency clearances can be sought to dispense chaff.

7.1.1 There are no EPA restrictions in CONUS restricted air spaces (for example: air-to-ground gunnery ranges or warning areas).

7.1.2 EPA approval is not required when flying activities, complying with FAA regulations, are dispersed over a wide area and do not frequently (greater than once a day) pass over the same ground points.

7.2 Interference. To eliminate harmful interference in dense air traffic areas and reduce the number of terminations, every effort should be made to conduct chaff drops away from major air routes and air route hubs. Measured winds aloft will be plotted to ensure that the chaff does not drift into major air routes and air route hubs. In some cases, radar tracking of chaff clouds will

be required to verify the predicted drift and overall wind effects. Even when chaff dispensing is stopped at the request of the air traffic control radar facility, the interference due to chaff may remain for some time.

7.3 Designated Chaff Drop Areas. Chaff drop areas (primarily within controlled airspaces – MOAs, restricted areas, and warning areas) are established (using normal clearance request procedures per paragraph 5 of Enclosure C of reference (a) and paragraph 6 for who submits clearance requests) throughout the CONUS. These areas, in general, were designed to provide safe operating distances from commercial air routes and airports. Once a clearance request is approved, any Service organization may use these areas as long as the activity is scheduled with the using agency (airspace owner), coordinated with the DOD AFC (if within their AOR), conducted within the limits of the national clearance approval, and the following criteria are observed:

7.3.1 Chaff drop missions must be thoroughly planned. For each mission, consider the following factors during the planning phase:

- a. The geographic features of the area where the chaff is to be dispensed
- b. The wind conditions aloft
- c. Planned drop altitude and predicted rate of fall of chaff
- d. Allowances for error

7.3.2 H, I and J band chaff currently used in tactical training missions may be dropped within these areas with minimal restriction once an original clearance request has been approved. This “training chaff” is defined as not being effective below 6 GHz. (No resonant cuts below 6 GHz.) Interference to FAA systems by this chaff is minimal, but drop points must be at least 60 nm from any FAA terminal radar facility (airports). Local FAA notification is required prior to all chaff drops.

7.4 Restrictions on Rope Chaff. Rope chaff requires national-level approval, in addition to environmental approval. Rope chaff can damage high voltage transmission lines and create hazards to life and property. Every precaution must be taken to ensure that the rope chaff falls on water or on land devoid of high-voltage electric power transmission lines.

7.5 Chaff Frequency Requirements and Specifications

7.5.1 State which frequency bands are affected. Include the chaff's nomenclature or, if chaff is cut for R&D mission, specify the chaff's cut frequencies or overall frequency response. H, I and J band chaff, (training chaff) has the least potential for impact on air traffic control radars and will require the least amount of coordination and control.

7.5.2 State under what circumstances other frequency band chaff types must be dropped (tactical and R&D chaff like RR-170 or special cut chaff for specific testing). These types of

chaff, effective at the lower bands, have much greater potential for interference to FAA radars and requires the most coordination and control. If it is necessary to drop chaff that affects the Delta/Echo frequency bands, describe safety precautions you intend to use to ensure that chaff will not drift into air traffic corridors or air traffic control (ATC) areas.

7.5.3 Provide number of bursts or bundles required, dispersal rates, stream parameters, and the total amount of chaff to be dispensed during the mission.

7.5.4 Specify all dispensing altitudes in *feet above mean sea level* (msl).

APPENDIX C

EA ACTIVITY AGAINST GLOBAL POSITIONING SYSTEM

1.0 Purpose

This Appendix provides the requirements and procedures for approving proposed EA in test and training exercises that impact GPS frequencies L1 (1575.42 MHz, ± 12 MHz) and L2 (1227.6 MHz, ± 12 MHz).

2.0 Policy

2.1 All requests for active RF emission in the GPS radio navigation frequency bands shall be submitted to the DOD AFC, range, or other local frequency management 90 days prior to planned RF emission date. The approval authority for EA impacting the GPS frequencies described in paragraph 1.0 is the Joint Staff; however, coordination with the FAA is also required for EA affecting L1.

2.2 DOD AFC, range, or other local frequency management will ensure that requesters use modeling tools approved by the FAA, US Coast Guard, and the Joint Spectrum Center (JSC) to characterize GPS EA interference effects. The modeling results will be provided to the Joint Staff at the same time as the EA request.

2.3 The JSC uses GPS-ITAS as the standard GPS interference-modeling tool for assessing the impact of typical, active RF emissions (continuous wave, tones, noise, etc.) in the GPS radio navigation bands.

3.0 GPS EA Request Procedures

The procedures described in this section facilitate the EA coordination process and ultimately reduce the required lead-time for processing EA requests on GPS frequencies. Failure to provide the required lead-time of 60 days may result in the denial of the EA request.

3.1 DOD AFC, range, or other local frequency management within the U.S. and Possessions (US&P) will submit all GPS EA requests to the Joint Staff/DDGO (Deputy Director for Global Operations). GPS EA requests affecting L1 shall also be sent to the FAA. Requests should be submitted a minimum of 60 days prior to planned RF emission date. Organizations planning to conduct EA activities for exercises occurring over a period of time are required to submit one plan covering the proposed activities. Modeling tool results will be submitted to the Joint Staff along with the specific request.

3.2 In addition to requirements in CJCSI 3210.03 (series)⁴, DOD AFC, range, or other local frequency management within the US&P must include GPS modeling results and the following

⁴ CJCSI 3210.03 (series), Chairman Joint Chiefs of Staff Instructions, *Joint Command and Control Warfare Policy*, January 2002.

information in their request. When the EA operations use other than continuous wave, tones, noise, etc., the JSC will model the EA effects and the potential interference to civil GPS users based on test parameters.

3.2.1 Specify overall security classification/declassification guidance, as well as individual item classification.

3.2.2 Specify the GPS EA activity (operational, exercise, test support, etc.).

3.2.3 Specify agency/group requesting GPS EA coordination.

3.2.4 Specify POC(s) for GPS EA, DSN/commercial phone number, e-mail address, SIPRNET, and pager number. It is important that the POC(s) be able to answer technical and operational questions related to the GPS EA.

3.2.5 Specify date(s), times(s), and location of the proposed GPS EA.

3.2.6 Briefly describe the GPS EA (operational concept of employment).

3.2.7 Specify platform, jammer, and transmitter nomenclature(s) involved in the GPS EA.

3.2.8 Give the following information for the EA transmitter(s):

- a. Number of transmitters
- b. Transmit frequency or frequencies
- c. Signal bandwidth of each transmitter
- d. Signal type
- e. Signal duty cycle
- f. Pulse repetition rate
- g. Pulse duration
- h. Tone spacing (if multiple tones) (optional)
- i. Power input(s) to the antenna(s)
- j. Transmitter power control technique/description (if known)
- k. Antenna type (manufacturer/model: e.g., horn, dipole, Yagi)
- l. Antenna polarization

m. Main beam gain (dBi)

n. Provide antenna pattern (azimuth and elevation). Without the antenna pattern information, a conservative antenna pattern may be used in the interference model. This may in turn increase the predicted interference and lessen the chances of EA approval.

o. Site elevation (optional)

p. Antenna height(s) (in agl or msl units). Use platform altitude if jammer is on an airborne platform.

q. Pointing azimuth and elevation angle for each antenna (minimum/maximum/nominal). If the azimuth and elevation angle is not given, then it is assumed that the antenna will point at azimuths ranging from 0-360 degrees and elevations from -90 to +90 degrees.

r. Coordinates in WGS84 (latitude/longitude) of each antenna (surface-based EA)

s. Ground track pattern (boundaries) for each airborne EA platform

3.3 The Joint Staff will forward EA requests and EA interference model results to the JSC. The JSC will provide quality assurance and additional interference modeling, as required. The JSC will maintain technical data on GPS receivers to facilitate their evaluation. To the maximum extent possible, the Joint Staff/DDGO will coordinate its findings with the FAA and, if necessary, the U.S. Coast Guard prior to finalizing its assessment.

3.4 Any GPS-EA issues regarding specific events that are not resolved between the DOD and DOT will be resolved through the Interagency GPS Executive Board.

3.5 The Joint Staff/DDGO evaluates each EA request based on the following areas of concern:

3.5.1 Impact on civil GPS users: GPS EA with potential damage to receiver equipment will be disapproved.

3.5.2 Safety: GPS EA must not threaten human life or safety of flight.

3.5.3 Potential for compromising classified capabilities: EA will not compromise classified capabilities. Security measures to minimize the risk of compromise should be considered.

3.6 All GPS EA must have Joint Staff approval prior to commencing operations in the United States, its territories, and adjacent FAA-controlled airspace. The FAA will coordinate EA requests affecting GPS L1 operations with civil agencies as well as the U.S. Coast Guard and other DOT offices.

3.7 The Joint Staff will provide approval/disapproval notification to the Service FMO or combatant commander not later than 10 days prior to proposed EA commencement. Service FMO will send the appropriate clearance message upon receipt of Joint Staff notification.

3.8 In order to maximize use of the national airspace system and protect DOD ability to conduct EA for tests, training, and exercises, feedback of GPS EA jammer on and off times is required for all EA events. The requester will send specific date and times of GPS EA jammer on and off times via Defense Message System (DMS) or AUTODIN within 20 days of event completion to "THE JOINT STAFF//DDGO-SOD/DDIO//." The JSC should be included as an information addressee.

3.9 Incident reporting. All DOD users of GPS will notify the USSPACECOM GPS Support Center (GPSSC) via AUTODIN or DMS message (GPS SUPPORT CENTER SCHRIEVER AFB CO) of any interference of the GPS navigation signal using the guidelines provided in CJCSM 3320.02. The interference may be initially reported using the GPSSC website at gps_support@spacecom.smil.mil; however, a formal AUTODIN or DMS message must also be sent. USSPACECOM notification procedures will not replace CEASE BUZZER procedures outlined in enclosure H of reference (a).

REFERENCES

1. DOD 5200.1-R, *Department of Defense Information Security Program Regulation*, January, 1997.
2. CJCSM 3212.02A, Chairman Joint Chiefs of Staff Manual, *Performing Electronic Attack in the United States and Canada for Tests, Training and Exercises*, March 2002.
3. CJCSI 3210.03 (series), Chairman Joint Chiefs of Staff Instructions, *Joint Command and Control Warfare Policy*, January 2002.
4. Joint Publication 1-02, *Dept. of Defense Dictionary of Military and Associated Terms*, April 2001 (amended 14 Aug 2002).